WHAT IS CLAIMED IS:

- 1. A memory device comprising:
 - a magneto-resistive random access memory (MRAM);
 - a cache comprising a volatile memory; and
- a decoder configured to translate referenced addresses to physical addresses to access data and pass the data between the MRAM and the cache and between the cache and a controller.
- 2. The memory device of claim 1, wherein the decoder translates referenced addresses from the controller to physical addresses in the MRAM and the cache.
- 3. The memory device of claim 1, further comprising:
 an error detection and correction circuit electrically coupled to the cache
 and the MRAM, the error detection and correction circuit configured for error
 correction encoding and decoding of the data.
- 4. The memory device of claim 1, wherein the cache comprises static random access memory.
- 5. The memory device of claim 1, wherein the cache comprises dynamic random access memory.
- 6. The memory device of claim 1, wherein the cache, the MRAM, and the decoder are fabricated on a single semiconductor substrate.
- 7. The memory device of claim 1, wherein the cache comprises one of a unified cache and a segmented cache.
- 8. The memory device of claim 7, wherein the segmented cache comprises a data segment and an instructions segment.

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- 9. A memory device comprising:
 - a magneto-resistive random access memory (MRAM);
 - a volatile memory; and
- a virtual memory controller configured to pass data between the MRAM, the volatile memory, and a host.
- 10. The memory device of claim 9, wherein the controller passes data between the volatile memory and the host based upon requests from the host.
- 11. The memory device of claim 9, wherein the volatile memory comprises a static random access memory.
- 12. The memory device of claim 9, wherein the volatile memory comprises a dynamic random access memory.
- 13. The memory device of claim 9, wherein a portion of the MRAM comprises a page file.
- 14. A method for reading data or instructions from a memory device that comprises a magneto-resistive random access memory (MRAM) coupled to a cache comprising:

receiving a request from a controller to read data from the MRAM; determining if the requested data is located in the cache;

passing the data from the MRAM to the cache if the data is not located in the cache; and

passing the data to the controller from the cache.

- 15. The method of claim 14, further comprising: error correction decoding the data from the MRAM.
- 16. The method of claim 14, wherein the request comprises reference addresses, the method further comprising:

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translating the reference addresses to physical addresses.

17. A method for writing data to a memory device that comprises magnetoresistive random access memory (MRAM) coupled to a cache comprising:

receiving a request from a controller to write data to the MRAM;

determining if a memory block where the data is to be stored is located in the cache;

passing the memory block from the MRAM to the cache if the memory block is not located in the cache;

passing the data from the controller to the cache; and passing the data from the cache to the MRAM.

- 18. The method of claim 17, further comprising: error correction encoding the data from the cache.
- 19. The method of claim 17, wherein the request comprises reference addresses, the method further comprising: translating the reference addresses to physical addresses.
- 20. A portable electronic device comprising:
 - a processor; and
 - a semiconductor memory device comprising:
 - a magneto-resistive random access memory (MRAM);
 - a cache comprising a volatile memory; and
 - a control and address decoder configured to control the passing of data between the MRAM and the cache and between the cache and the processor.
- 21. The portable electronic device of claim 20, wherein the portable electronic device comprises a display.

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22. The portable electronic device of claim 20, wherein the portable electronic device is one of a personal digital assistant, a cellular telephone, a digital music player, a personal organizer, and a digital camera.